



### Gulf of Maine Significant Events – September–November 2018

#### September:

**Temperature swings** occurred frequently during September. From **September 3 to 6**, the region experienced highs up to 36°C (97°F). Cold air moved in from **September 9 to 10**, with lows dropping to -3°C (27°F) in the Maritimes. From **September 12 to 18**, [highs were near 30°C \(86°F\)](#) in the three provinces and northern Maine, but cold air returned to these areas from **September 24 to 25** with lows down to -3.3°C (26°F) and [widespread frost](#). Daily max and min temperature records were set each time. Strong **cold fronts** crossed the Maritimes from [September 21 to 22](#) and [September 26 to 27](#), causing thousands of power outages.

#### October:

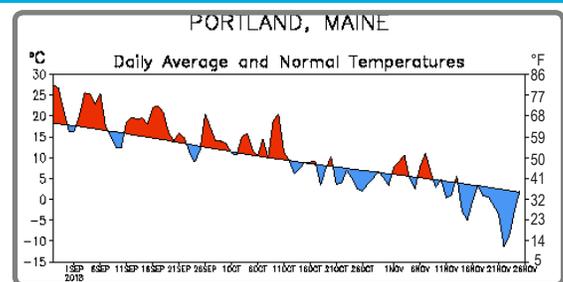
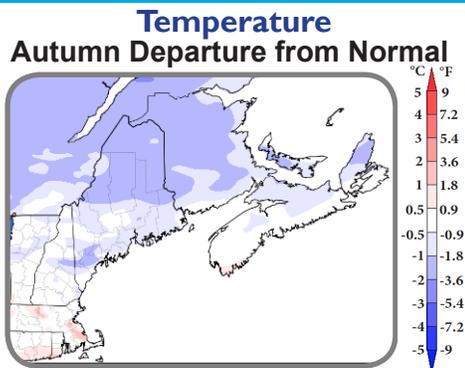
A rapidly intensifying storm brought up to 82 mm (3 in.) of rain and **strong winds** to the Maritimes from **October 15 to 16**. The strongest gusts of over 120 km/h (75 mph) were in Cape Breton, N.S. The winds [downed trees](#), left more than 60,000 customers without power, and [disrupted travel](#). On **October 23**, a [rare EF-1 tornado](#) touched down in Norton, MA, uprooting and snapping numerous trees. Since 1950, there have only been seven other October tornadoes in Massachusetts, with the last one occurring in 1970. There were also several reports of waterspouts in Cape Cod Bay. The same storm system brought the **first significant snow** to parts of New Hampshire, Maine, and New Brunswick, with up to 30 cm (12 in.) of snow from **October 23 to 25**. Up to 110 mm (4 in.) of rain fell in other parts of the Maritimes. A **powerful storm** brought up to 125 mm (5 in.) of rain, 15 cm (6 in.) of snow, and some ice accumulation to the region from **October 27 to 29**. Wind gusts of up to 101 km/h (63 mph) occurred, with a peak gust of 156 km/h (97 mph) in Grand Etang, N.S. The high winds led to [power outages](#), cancelled ferry services, downed trees, and [minor coastal flooding](#). Prior to the storm on the 27th, several Maritimes sites set daily min temperature records with lows down to -12°C (10°F).

#### November:

A **series of storms** moved through the region in **November**. From **November 2 to 4**, a powerful storm system produced **wind gusts** up to 119 km/h (74 mph) and dropped up to 100 mm (4 in.) of rain on the region. Another intense storm from **November 15 to 16** brought up to 30 cm (12 in.) of snow, with **thundersnow** reported in [eastern Massachusetts](#). From **November 27 to 29**, a potent storm with **winds** up to 140 km/h (87 mph) dropped up to 30 cm (12 in.) of snow on the Maritimes. As these storms exited the region, cold air moved in behind them, setting numerous **minimum temperature records**. For instance, following the November 15–16 storm, temperatures were as low as -23°C (-9°F). This November ranked among the **five coldest Novembers** on record for [several sites](#). In addition, the **persistent storminess** caused this November to rank among the **five wettest Novembers** and/or **five snowiest Novembers** on record for several sites. See Regional Impacts for details on the November storms.



### Regional Climate Overview – September–November 2018



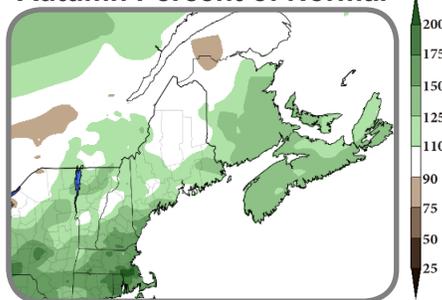
Temperatures were above normal during the first half of autumn (shaded red) and below normal during the second half of autumn (shaded blue). Credit: NOAA CPC

**Autumn** temperatures (averaged over September, October, and November) ranged from 2°C (4°F) below normal to near normal for most of the region (image above). **September** temperatures ranged from near normal in parts of the Maritimes to 3°C (5°F) above normal in parts of New England. **October** temperatures ranged from 3°C (5°F) below normal in northern Maine and northern New Brunswick to near normal in Massachusetts, New Hampshire, and Nova Scotia. **November** temperatures ranged from 4°C (7°F) below normal in parts of New Hampshire, Maine, and central New Brunswick to near normal in southeastern Massachusetts and parts of Nova Scotia.

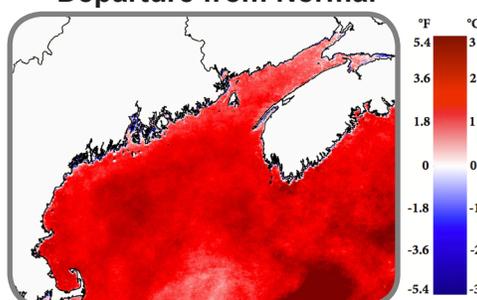
Temperature normals based on 1981-2010 data

# Regional Climate Overview – September–November 2018

## Precipitation Autumn Percent of Normal



## Sea Surface Temperatures Departure from Normal

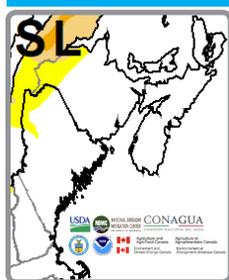


**Autumn** precipitation (accumulated from September–December) generally ranged from 75% of normal in northern New Brunswick to 200% of normal in southeastern Massachusetts (image above). **September** precipitation ranged from 25% of normal in New Brunswick and Nova Scotia to more than 200% of normal in New Hampshire and Massachusetts. **October** precipitation ranged from 50% of normal in northern New Brunswick to 200% of normal in eastern Nova Scotia. **November** precipitation ranged from near normal in northern New Brunswick to more than 200% of normal in parts of New England.

**Autumn** sea surface temperature anomalies were strongly above (1–3°C [2–5°F]) the 30-year average over the region. In the Gulf of Maine, positive anomalies were strongest over the deeper central basins (around 2.5°C [4.5°F]) and slightly weaker in coastal waters (around 1.5°C [2.7°F]). Off the shelf south of Nova Scotia, a warm patch of temperature anomalies were around 3.5°C (6.3°F) above normal.

SST normals based on 1985–2014 data  
U.S. precipitation normals based on 1981–2010 data; Canadian precipitation normals based on 2002–2017.

# Regional Impacts – September–November 2018



**Intensity:**  
 D0 Abnormally Dry  
 D1 Drought - Moderate  
 D2 Drought - Severe  
 D3 Drought - Extreme  
 D4 Drought - Exceptional  
**Drought Impact Types:**  
 ~ Delineates dominant impacts  
 S = Short-Term, typically <6 months (e.g. agriculture, grasslands)  
 L = Long-Term, typically >6 months (e.g. hydrology, ecology)

## Dry Early Autumn

The first half of autumn was warm and dry (except Massachusetts, which was generally wet). At the start of **September**, northwestern New Brunswick, southwestern Nova Scotia, and coastal Maine were in a moderate drought, with abnormal dryness elsewhere in the region. During the month, there were **water shortages** in parts of Nova Scotia as shallow wells ran dry. The province [trucked in drinking water](#) for several communities. Fire departments [delivered water](#) to homes and were [set up as water stations](#). When fighting fires, the departments contended with dried up water holes and wells. In Aroostook County, ME, dry conditions contributed to a [hay shortage](#) and allowed bedstraw, an invasive plant species, to flourish, **reducing the number of acres of hay** for some farmers. At the end of September, parts of New Brunswick and Nova Scotia remained in a drought, and abnormal dryness expanded in the rest of the Maritimes and northern Maine.

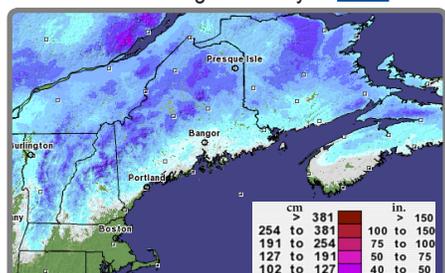
November 30, 2018 [North American Drought Monitor](#).



Snapped power poles in P.E.I. from the Nov. 27 to 29 storm. Image courtesy of [CBC](#).

## Stormy Late Autumn

Around mid-**October**, the weather pattern shifted, leading to cool conditions and frequent storms during the rest of autumn. Precipitation in October and November helped **dry conditions improve** in the region, except in northern New Brunswick and northern Maine. However, it made [potato harvest difficult](#) in P.E.I. Another consequence of heavy rain events is the discharge of [sewage into waterways](#) in parts of Massachusetts. Strong winds during the powerful **November 2 to 4** storm left [over 100,000 customers](#), mostly in New Brunswick, **without power** for up to six days. Many businesses and homeowners reported **roof damage**, which kept [roofing companies busy](#). During the **November 27 to 29 storm** strong winds and heavy snow left [375,000 customers without power](#) in the three provinces, and some [coastal flooding](#) and erosion occurred along the coastlines. Due to stormy conditions, the start of the lobster season [was delayed](#) in Nova Scotia.



Modeled snow depth as of December 1. Credit: [NOAA NOHRSC](#).

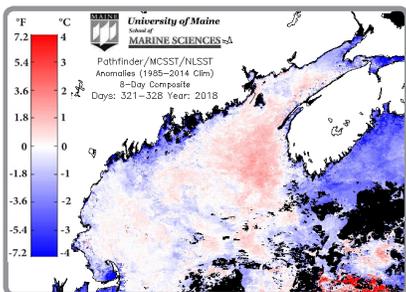
## November Snowfall

The **November** storms left much of the region with a **surplus of snowfall**. This November ranked among the **five snowiest Novembers** on record for Portland and [Caribou](#), ME, and for several locations in the Maritimes, where snowfall was as much as two to more than three times normal. The snow gave the **ski industry a boost**, with [downhill](#) and [cross country](#) trails opening early. However, communities had to dip in to their [winter snow removal budgets early](#), and schools have already used a few [snow days](#).

## Regional Impacts – September–November 2018

	2018 Season	Average Season
Number of Named Storms	15	12
Number of Hurricanes	8	6
Number of Major Hurricanes	2	3

The 2018 Atlantic hurricane season compared to an average season.



November 17 to 24 SSTs were below normal over shallow coastal regions off Massachusetts, central Maine, and Nova Scotia due to strong cooling from the cold air temperatures.

### Hurricane Season

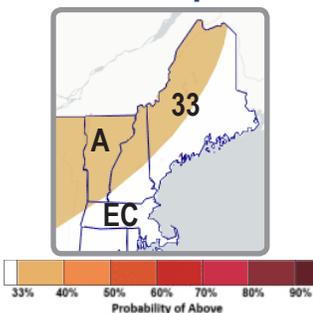
For the third consecutive year, the Atlantic hurricane season featured **above normal activity**. In 2018, there were **15 named storms**, eight of which were hurricanes, with two of those being major hurricanes. An average season has 12 named storms, six of which are hurricanes, with three of those being major hurricanes. It was the fourth year in a row that hurricane activity began before the official start of the season (June 1), and the first year since 2008 to have four named active storms at the same time. According to NOAA, "Warmer Atlantic Ocean temperatures, a stronger west-African monsoon and the fact that El Niño did not form in time to suppress the season helped to enhance storm development." During autumn, the remnants of several **tropical systems** affected the region. Gordon's remnants dropped up to 133 cm (5.25 in.) of rain from **September 11 to 12**. From **September 18 to 19**, Florence's remnants brought up to 152 mm (6 in.) of rain and caused **flooding**, downed trees, and **power outages** in Massachusetts. Hurricane Leslie remained well offshore, but created **rough surf and rip tides** along Nova Scotia's Atlantic coast from **October 5 to 6**. From **October 10 to 12**, a frontal system combined with Michael's remnants brought up to 102 cm (4 in.) of rain, strong winds, and high waves.

### Sea Turtles and Ocean Temperatures

Researchers indicate that warming waters are **expanding sea turtles' range into the Gulf of Maine**; however, sudden cold spells can leave them vulnerable to dangerously low temperatures. On **November 23**, more than 170 **sea turtles froze to death** off the coast of Cape Cod, MA. A combination of sudden cold temperatures, strong winds, and high tide left the turtles unable to escape to warmer waters.

## Regional Outlook – Winter 2018–19

### Temperature and Precipitation



CPC temperature map (left) produced Nov 15.  
ECCC temperature map (above) produced Nov 30.

For **December–February**, [NOAA's Climate Prediction Center \(CPC\)](#) favors above-normal temperatures for western Maine and the northern half of New Hampshire. [Environment and Climate Change Canada \(ECCC\)](#) predicts an increased chance of below-normal temperatures for the northern half of New Brunswick and western P.E.I. and an increased chance of above-normal temperatures for western Nova Scotia. Equal chances of below-, near-, or above-normal temperatures were forecast for the rest of the Gulf of Maine region. The precipitation outlooks call for an increased chance of below-normal precipitation for P.E.I., southeastern New Brunswick, and parts of Nova Scotia and equal chances for the rest of the region.



ECCC precipitation map (left) produced Nov 30.

### Contacts

[National Oceanic and Atmospheric Administration](#)

[Environment and Climate Change Canada:](#)

1-800-668-6767 (in Canada only)

819-997-2800 (long-distance charges apply)

[Northeast Regional Climate Center](#)

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### Gulf of Maine Partners

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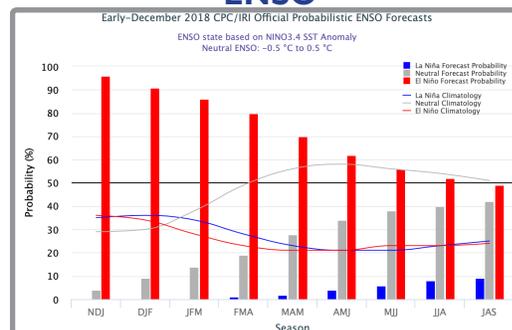
[Cooperative Institute for the North Atlantic Region](#)

[Gulf of Maine Council on the Marine Environment, Climate & Network](#)

[Northeast Regional Association of Coastal and Ocean Systems](#)

[University of Maine, School of Marine Sciences](#)

### ENSO



El Niño-Southern Oscillation (ENSO) neutral conditions continued in November. NOAA's Climate Prediction Center indicates there is a 90% chance that El Niño **will form and continue during winter** and a 60% chance it will continue through spring. This El Niño is expected to be weak. See NOAA's Eastern Region Climate Services [November webinar](#) for more information.